CLAIMS

1. A wireless communication system, comprising:

at least one first sectored cell having a first plurality of sectors, the at least one first sectored cell using a first plurality of channels and a first channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one first sectored cell; and

at least one second sectored cell contiguous with the at least one first sectored cell, the at least one second sectored cell having a second plurality of sectors and using the same first plurality of channels, the at least one second sectored cell using a second channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one second sectored cell, wherein the second channel sequence and the first channel sequence are different.

2. The system of claim 1, wherein the first plurality of channels includes at least two channels having at least one of different carrier frequencies, different polarizations, different time slots, and different codes.

3. The system of claim 1, wherein:

the at least one second sectored cell includes at least two second sectored cells that are each contiguous with the at least one first sectored cell such that the at least one first sectored cell and the at least two second sectored cells form a group of at least three sectored cells that are mutually adjacent and define at least three bore axes, each bore axis of the at least three bore axes passing through a center of each of two cells of the at least three sectored cells; and

the at least three sectored cells are arranged with respect to each other such that sectors of the at least three sectored cells that are similarly oriented approximately along one bore axis of the at least three bore axes and in which radiation is transmitted in essentially a same direction approximately along the one bore axis use different channels.

4. The system of claim 3, wherein the at least three sectored cells are arranged using at least three different cell configurations, at least two cell configurations of the at least three different cell configurations each being uniquely identified by at least a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

5. The system of claim 4, wherein each cell configuration of the at least three different cell configurations is uniquely identified by at least one of a particular azimuth orientation of a cell about the center of the cell and a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

6. The system of claim 4, wherein each cell configuration of the at least three different cell configurations is uniquely identified by at least one of a particular azimuth orientation of a cell about the center of the cell, a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell, and particular channel types used in the cell.

7. The system of claim 3, wherein:

the at least three sectored cells include at least seven sectored cells, a first cell of the at least seven sectored cells being adjacent with each of six other cells of the at least seven sectored cells such that the six other cells surround the first cell; and

the at least seven cells are arranged with respect to each other such that sectors of adjacent cells of the at least seven cells that are similarly oriented approximately along one bore axis of the plurality of bore axes and in which radiation is transmitted in essentially a same direction approximately along the one bore axis use different channels.

8. The system of claim 7, wherein:

each cell of the at least seven sectored cells has S sectors;

each cell of the at least seven sectored cells uses the same plurality of C different channels, wherein $C \leq S$;

adjacent sectors in each cell do not use same channels of the C different channels;

the at least seven sectored cells are arranged using up to K different cell configurations, each different cell configuration using all of the C different channels, at least two different cell configurations of the K different cell configurations each being uniquely identified by a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around a cell.

9. The system of claim 8, wherein each cell configuration of the K different cell configurations is uniquely identified by a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

10. The system of claim 9, wherein K is given by the formula $K = (C! / C)(C-1)^{(S-C)}$.

11. The system of claim 10, wherein S and C are chosen such that K is equal to at least seven.

12. The system of claim 10, wherein:

S is equal to at least five; and

C is equal to at least three.

13. The system of claim 7, wherein the at least seven sectored cells are arranged using at least seven different cell configurations, at least two cell configurations of the at least seven different cell configurations each being uniquely identified by at least a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

14. The system of claim 13, wherein the at least seven sectored cells are arranged using at least seven different cell configurations, each cell configuration of the at least seven different cell configurations being uniquely identified by at least one of a particular azimuth orientation of a cell about the center of the cell and a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

15. The system of claim 13, wherein the at least seven sectored cells are arranged using at least seven different cell configurations, each cell configuration of the at least seven different cell configurations being uniquely identified by at least one of a particular azimuth orientation of a cell about the center of the cell, a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell, and particular channel types used in the cell.

16. The system of claim 13, wherein:

each cell of the at least seven sectored cells is divided into at least seven sectors; and

the first plurality of channels used in each cell includes at least seven different channels.

17. The system of claim 16, wherein:

the at least seven different channels include at least seven different channel sets, each channel of the at least seven different channels including a respective channel set; and

each respective channel set includes at least one of a plurality of frequency channels, a plurality of time slot channels, and a plurality of coded channels.

18. The system of claim 17, wherein each respective channel set is uniquely identified from other channel sets of the at least seven different channel sets as having at least one of a different frequency band and a different polarization than the other channel sets.

19. The system of claim 16, wherein each cell is divided into 6N sectors, N being an integer.

20. The system of claim 19, wherein the at least seven different channels include eight different channels.

21. The system of claim 20, wherein each cell is divided into 24 sectors.

22. The system of claim 21, wherein the eight different channels are each reused three times in each cell.

23. A wireless communication system, comprising:

at least seven mutually adjacent sectored cells that define at least three bore axes, each bore axis of the at least three bore axes passing through a center of each of three cells of the at least seven sectored cells, the at least seven mutually adjacent sectored cells including:

at least one first sectored cell having a first plurality of sectors, the at least one first sectored cell using a first plurality of channels and a first channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one first sectored cell; and

at least one second sectored cell adjacent to the at least one first sectored cell, the at least one second sectored cell having a second plurality of sectors and using the same first plurality of channels, the at least one second sectored cell using a second channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one second sectored cell, wherein the second channel sequence and the first channel sequence are different,

wherein the at least seven mutually adjacent sectored cells are arranged with respect to each other such that sectors of adjacent cells of the at least seven cells that are similarly oriented approximately along one bore axis of the plurality of bore axes and in which radiation is transmitted in essentially a same direction approximately along the one bore axis use different channels.

24. A wireless communication system, comprising:

at least seven mutually adjacent sectored cells including:

at least one first sectored cell having a first plurality of sectors, the at least one first sectored cell using a first plurality of channels and a first channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one first sectored cell; and

at least one second sectored cell adjacent to the at least one first sectored cell, the at least one second sectored cell having a second plurality of sectors and using the same first plurality of channels, the at least one second sectored cell using a second channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one second sectored cell, wherein the second channel sequence and the first channel sequence are different,

wherein the at least seven sectored cells are arranged using at least seven different cell configurations, at least two different cell configurations of the at least seven different cell configurations being uniquely identified by at least a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

25. The system of claim 24, wherein each cell configuration of the at least seven different cell configurations is uniquely identified by at least one of a particular azimuth orientation of a cell about the center of the cell and a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

26. The system of claim 24, wherein each cell configuration of the at least seven different cell configurations is uniquely identified by at least one of a particular azimuth orientation of a cell about the center of the cell, a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell, and particular channel types used in the cell.

27. The system of claim 25, wherein:

each cell of the at least seven mutually adjacent sectored cells is divided into at least seven sectors; and

the first plurality of channels used in each cell includes at least seven different channels.

28. The system of claim 27, wherein:

the at least seven different channels include at least seven different channel sets, each channel of the at least seven different channels including a respective channel set; and

each respective channel set includes at least one of a plurality of frequency channels, a plurality of time slot channels, and a plurality of coded channels.

29. The system of claim 28, wherein each respective channel set is uniquely identified from other channel sets of the at least seven different channel sets as having at least one of a different frequency band and a different polarization than the other channel sets.

30. The system of claim 27, wherein each cell is divided into 6N sectors, N being an integer.

31. The system of claim 30, wherein the at least seven different channels include eight different channels.

32. The system of claim 31, wherein each cell is divided into 24 sectors.

33. The system of claim 32, wherein the eight different channels are each reused three times in each cell.

34. A wireless communication system, comprising:

at least three mutually adjacent sectored cells having up to K different cell configurations, K being an integer not less than three, each cell configuration of the K different cell configurations including a sectored cell having S sectors, S being an integer, each sectored cell using a same set of C different channels to transport information, C being an integer not exceeding S, wherein adjacent sectors in each cell do not use same channels of the C different channels, at least two different cell configurations of the K different cell configurations each being uniquely identified by a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around a cell.

35. The system of claim 34, wherein each cell configuration of the K different cell configurations is uniquely identified by a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around a cell.

36. The system of claim 35, wherein K is given by the formula $K = (C! / C)(C-1)^{(S-C)}$.

37. The system of claim 36, wherein S and C are chosen such that K is equal to at least seven.

38. The system of claim 36, wherein:
S is equal to at least five; and
C is equal to at least three.

39. The system of claim 34, wherein S = 6N, N being an integer.

40. In a wireless communication system comprising at least one first sectored cell having a first plurality of sectors and at least one second sectored cell contiguous with the at least one first sectored cell, the at least one second sectored cell having a second plurality of sectors, a wireless communication method, comprising acts of:

using a first plurality of channels and a first channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one first sectored cell; and

using the same first plurality of channels and a second channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one second sectored cell, wherein the second channel sequence and the first channel sequence are different.

41. The method of claim 40, wherein the first plurality of channels includes at least two channels having at least one of different carrier frequencies, different polarizations, different time slots, and different codes.

42. The method of claim 40, wherein:

the at least one second sectored cell includes at least two second sectored cells that are each contiguous with the at least one first sectored cell such that the at least one first sectored cell and the at least two second sectored cells form a group of at least three sectored cells that are mutually adjacent and define at least three bore axes, each bore axis of the at least three bore axes passing through a center of each of two cells of the at least three sectored cells; and

the method further comprises an act of:

arranging the at least three sectored cells with respect to each other such that sectors of the at least three sectored cells that are similarly oriented approximately along one bore axis of the at least three bore axes and in which radiation is transmitted in essentially a same direction approximately along the one bore axis use different channels.

43. The method of claim 42, wherein the act of arranging includes an act of arranging the at least three sectored cells using at least three different cell configurations, at least two cell configurations of the at least three different cell configurations each being uniquely identified by at least a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

44. The method of claim 43, wherein the act of arranging includes an act of arranging the at least three sectored cells using at least three different cell configurations, each cell configuration of the at least three different cell configurations being uniquely identified by at least one of a particular azimuth orientation of a cell about the center of the cell and a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

45. The method of claim 42, wherein:

the at least three sectored cells include at least seven sectored cells, a first cell of the at least seven sectored cells being adjacent with each of six other cells of the at least seven sectored cells such that the six other cells surround the first cell; and

the act of arranging comprises an act of:

arranging the at least seven cells with respect to each other such that sectors of adjacent cells of the at least seven cells that are similarly oriented approximately along one bore axis of the plurality of bore axes and in which radiation is transmitted in essentially a same direction approximately along the one bore axis use different channels.

46. The method of claim 45, wherein:

each cell of the at least seven sectored cells has S sectors;

each cell of the at least seven sectored cells uses the same plurality of C different channels, wherein $C \leq S$;

adjacent sectors in each cell do not use same channels of the C different channels; and

the act of arranging includes an act of:

arranging the at least seven sectored cells using up to K different cell configurations, each different cell configuration using all of the C different channels and at least two different cell configurations of the K different cell configurations each being uniquely identified by a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

47. The method of claim 46, wherein K is given by the formula $K = (C! / C)(C-1)^{(S-C)}$.

48. The method of claim 47, further comprising an act of choosing S and C such that K is equal to at least seven.

49. The method of claim 47, wherein:

S is equal to at least five; and

C is equal to at least three.

50. The method of claim 45, wherein the act of arranging includes an act of arranging the at least seven sectored cells using at least seven different cell configurations, at least two cell configurations of the at least seven different cell configurations each

being uniquely identified by at least a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

51. The method of claim 50, wherein the act of arranging includes an act of arranging the at least seven sectored cells using at least seven different cell configurations, each cell configuration of the at least seven different cell configurations each being uniquely identified by at least one of a particular azimuth orientation of a cell about the center of the cell and a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

52. The method of claim 50, wherein:

each cell of the at least seven sectored cells is divided into at least seven sectors; and

the first plurality of channels used in each cell includes at least seven different channels.

53. The method of claim 52, wherein:

the at least seven different channels include at least seven different channel sets, each channel of the at least seven different channels including a respective channel set; and

each respective channel set includes at least one of a plurality of frequency channels, a plurality of time slot channels, and a plurality of coded channels.

54. The method of claim 53, wherein each respective channel set is uniquely identified from other channel sets of the at least seven different channel sets as having at least one of a different frequency band and a different polarization than the other channel sets.

55. The method of claim 52, wherein each cell is divided into 6N sectors, N being an integer.

56. The method of claim 55, wherein the at least seven different channels include eight different channels.

57. The method of claim 56, wherein each cell is divided into 24 sectors.

58. The method of claim 57, wherein the eight different channels are each reused three times in each cell.

59. In a wireless communication system comprising at least seven mutually adjacent sectored cells that define at least three bore axes, each bore axis of the at least three bore axes passing through a center of each of three cells of the at least seven sectored cells, the at least seven mutually adjacent sectored cells including at least one first sectored cell having a first plurality of sectors and at least one second sectored cell adjacent to the at least one first sectored cell, the at least one second sectored cell having a second plurality of sectors, a wireless communication method comprising acts of:

using a first plurality of channels and a first channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one first sectored cell;

using the same first plurality of channels and a second channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one second sectored cell, wherein the second channel sequence and the first channel sequence are different; and

arranging the at least seven mutually adjacent sectored cells with respect to each other such that sectors of adjacent cells of the at least seven cells that are similarly oriented approximately along one bore axis of the plurality of bore axes and in which radiation is transmitted in essentially a same direction approximately along the one bore axis use different channels.

60. In a wireless communication system comprising at least seven mutually adjacent sectored cells including at least one first sectored cell having a first plurality of sectors and at least one second sectored cell adjacent to the at least one first sectored

cell, the at least one second sectored cell having a second plurality of sectors, a wireless communication method comprising acts of:

using a first plurality of channels and a first channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one first sectored cell;

using the same first plurality of channels and a second channel sequence for successive adjacent sectors proceeding in a clockwise direction around the at least one second sectored cell, wherein the second channel sequence and the first channel sequence are different; and

arranging the at least seven sectored cells using at least seven different cell configurations, at least two different cell configurations of the at least seven different cell configurations being uniquely identified by at least a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

61. The method of claim 60, wherein each cell configuration of the at least seven different cell configurations is uniquely identified by at least one of a particular azimuth orientation of a cell about the center of the cell and a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

62. The method of claim 61, wherein:

each cell of the at least seven mutually adjacent sectored cells is divided into at least seven sectors; and

the first plurality of channels used in each cell includes at least seven different channels.

63. The method of claim 62, wherein:

the at least seven different channels include at least seven different channel sets, each channel of the at least seven different channels including a respective channel set; and

each respective channel set includes at least one of a plurality of frequency channels, a plurality of time slot channels, and a plurality of coded channels.

64. The method of claim 63, wherein each respective channel set is uniquely identified from other channel sets of the at least seven different channel sets as having at least one of a different frequency band and a different polarization than the other channel sets.

65. The method of claim 62, wherein each cell is divided into 6N sectors, N being an integer.

66. The method of claim 65, wherein the at least seven different channels include eight different channels.

67. The method of claim 66, wherein each cell is divided into 24 sectors.

68. The method of claim 67, wherein the eight different channels are each reused three times in each cell.

69. A wireless communication system, comprising:

at least seven sectored cells, each sectored cell of the at least seven sectored cells being divided into a plurality of sectors and being assigned a plurality of different channels such that adjacent sectors in each sectored cell use different channels, each sectored cell of the at least seven sectored cells having one of at least seven different cell configurations, each different cell configuration of the at least seven different cell configurations being uniquely identified by at least one of a particular azimuth orientation of a cell about a center of the cell, a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell, and particular channel types of the plurality of different channels used in the cell.

70. The system of claim 69, wherein at least two different cell configurations of the at least seven different cell configurations each is uniquely identified by at least the particular azimuth orientation of the cell about the center of the cell.

71. The system of claim 70, wherein the at least seven sectored cells include a first cell adjacent with each of six other cells of the at least seven sectored cells such that the six other cells surround the first cell, the first cell and the six other cells each using a different cell configuration of the at least seven different cell configurations to form a core sectored cell group.

72. The system of claim 71, wherein the at least seven sectored cells include a plurality of sectored cells arranged as an extended formation of a plurality of core sectored cell groups.

73. The system of claim 69, wherein at least two different cell configurations of the at least seven different cell configurations each is uniquely identified by at least the particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

74. The system of claim 73, wherein the at least seven sectored cells include a first cell adjacent with each of six other cells of the at least seven sectored cells such that the six other cells surround the first cell, the first cell and the six other cells each using a different cell configuration of the at least seven different cell configurations to form a core sectored cell group.

75. The system of claim 74, wherein the at least seven sectored cells include a plurality of sectored cells arranged as an extended formation of a plurality of core sectored cell groups.

76. The system of claim 69, wherein at least two different cell configurations of the at least seven different cell configurations each is uniquely identified by at least the particular channel types of the plurality of different channels used in the cell.

77. The system of claim 76, wherein the at least seven sectored cells include a first cell adjacent with each of six other cells of the at least seven sectored cells such that the six other cells surround the first cell, the first cell and the six other cells each

using a different cell configuration of the at least seven different cell configurations to form a core sectored cell group.

78. The system of claim 77, wherein the at least seven sectored cells include a plurality of sectored cells arranged as an extended formation of a plurality of core sectored cell groups.

79. The system of claim 69, wherein:

the at least seven sectored cells include a first cell adjacent with each of six other cells of the at least seven sectored cells such that the six other cells surround the first cell;

the at least seven sectored cells define a plurality of bore axes, each bore axis of the plurality of bore axes passing through a center of each of two cells of the at least seven sectored cells; and

the at least seven sectored cells are arranged with respect to each other such that sectors of adjacent cells of the at least seven sectored cells that are similarly oriented approximately along one bore axis of the plurality of bore axes and in which radiation is transmitted in essentially a same direction approximately along the one bore axis use different channels.

80. The system of claim 69, wherein each sectored cell of the at least seven sectored cells comprises:

at least one base station disposed approximately at a center of the sectored cell to exchange information over air with a respective plurality of subscriber stations disposed within the sectored cell, wherein each sectored cell has approximately a same radius and spans up to a 360 degree azimuth angle around the at least one base station.

81. The system of claim 80, wherein the at least one base station includes a lens-based sectored antenna system.

82. The system of claim 81, wherein the lens-based sectored antenna system includes a Luneberg-type lens.

83. The system of claim 81, wherein the lens-based sectored antenna system includes a Rotman-type lens.

84. In a wireless communication system comprising at least seven sectored cells, each sectored cell of the at least seven sectored cells being divided into a plurality of sectors and being assigned a plurality of different channels such that adjacent sectors in each sectored cell use different channels, a wireless communication method comprising an act of:

using a different cell configuration for each sectored cell of the at least seven sectored cells, each different cell configuration of the at least seven different cell configurations being uniquely identified by at least one of a particular azimuth orientation of a cell about a center of the cell, a particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell, and particular channel types of the plurality of different channels used in the cell.

85. The method of claim 84, wherein the act of using a different cell configuration for each sectored cell of the at least seven sectored cells includes an act of using at least two different cell configurations of the at least seven different cell configurations that are uniquely identified by at least the particular azimuth orientation of the cell about the center of the cell.

86. The method of claim 85, further comprising an act of forming at least one core sectored cell group using the at least seven sectored cells, the core sectored cell group including a first cell adjacent with each of six other cells of the at least seven sectored cells such that the six other cells surround the first cell, the first cell and the six other cells each using a different cell configuration of the at least seven different cell configurations.

87. The method of claim 86, wherein the at least one core sectored cell group includes a plurality of core sectored cell groups, and wherein the method further

comprises an act of arranging the plurality of core sectored cell groups as an extended formation.

88. The method of claim 84, wherein the act of using a different cell configuration for each sectored cell of the at least seven sectored cells includes an act of using at least two different cell configurations of the at least seven different cell configurations that are uniquely identified by at least the particular channel sequence for successive adjacent sectors proceeding in a clockwise direction around the cell.

89. The method of claim 88, further comprising an act of forming at least one core sectored cell group using the at least seven sectored cells, the core sectored cell group including a first cell adjacent with each of six other cells of the at least seven sectored cells such that the six other cells surround the first cell, the first cell and the six other cells each using a different cell configuration of the at least seven different cell configurations.

90. The method of claim 89, wherein the at least one core sectored cell group includes a plurality of core sectored cell groups, and wherein the method further comprises an act of arranging the plurality of core sectored cell groups as an extended formation.

91. The method of claim 84, wherein the act of using a different cell configuration for each sectored cell of the at least seven sectored cells includes an act of using at least two different cell configurations of the at least seven different cell configurations that are uniquely identified by at least the particular channel types of the plurality of different channels used in the cell.

92. The method of claim 91, further comprising an act of forming at least one core sectored cell group using the at least seven sectored cells, the core sectored cell group including a first cell adjacent with each of six other cells of the at least seven sectored cells such that the six other cells surround the first cell, the first cell and the

six other cells each using a different cell configuration of the at least seven different cell configurations.

93. The method of claim 92, wherein the at least one core sectored cell group includes a plurality of core sectored cell groups, and wherein the method further comprises an act of arranging the plurality of core sectored cell groups as an extended formation.

94. The method of claim 84, further comprising acts of:

forming at least one core sectored cell group using the at least seven sectored cells, the core sectored cell group including a first cell adjacent with each of six other cells of the at least seven sectored cells such that the six other cells surround the first cell, wherein the at least seven sectored cells define a plurality of bore axes, each bore axis of the plurality of bore axes passing through a center of each of two cells of the at least seven cells; and

arranging the at least seven sectored cells with respect to each other such that sectors of adjacent cells of the at least seven cells that are similarly oriented approximately along one bore axis of the plurality of bore axes and in which radiation is transmitted in essentially a same direction approximately along the one bore axis use different channels.

95. The method of claim 84, wherein each sectored cell of the at least seven sectored cells comprises:

at least one base station disposed approximately at a center of the sectored cell to exchange information over air with a respective plurality of subscriber stations disposed within the sectored cell, wherein each cell has approximately a same radius and spans up to a 360 degree azimuth angle around the at least one base station.

96. The method of claim 95, wherein the at least one base station includes a lens-based sectored antenna system.

97. The method of claim 96, wherein the lens-based sectored antenna system includes a Luneberg-type lens.

98. The method of claim 96, wherein the lens-based sectored antenna system includes a Rotman-type lens.